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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/776,427	02/11/2004	George M. Whitesides	H0498.70079US01/TJO	4054
7590 06/16/2006				
Timothy J. Oyer, Ph.D. Wolf, Greenfield & Sacks, P.C. 600 Atlantic Avenue Boston, MA 02210			EXAMINER DICUS, TAMRA	
			ART UNIT 1774	PAPER NUMBER

DATE MAILED: 06/16/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/776,427

Applicant(s)

WHITESIDES ET AL.

Examiner

Tamra L. Dicus

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 23 March 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 3-15,55-59 and 69-75 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☐ Claim(s) _____ is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>05-19-06, 07-15-05</u> | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

The 112 2nd rejection is withdrawn due to Applicant's amendments.

The Double Patenting Rejection is withdrawn due to Applicant's arguments.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 3-10, are rejected under 35 U.S.C. 102(b) as being anticipated by USPN 4,728,591 to Clark et al.

Clark teaches a device comprising: an article defining a surface (col. 2, line 32, e.g. substrate surface); and an isolated region of a self-assembled monolayer of a first molecular species having a function (col. 2, lines 49-55, e.g. a functional material deposited through holes such as a protein molecules) surrounded by a second molecular species on the surface (col. 2, lines 40-49, e.g. two-dimensional self-assembled molecular array of protein molecules). The isolated region in lateral dimension and area (encompassed by characteristic dimension) is between 1-50 nm (.01-.5 microns), meeting Applicant's range of less than about 10 microns, 5 microns, 1 micron, and 0.25 microns, less than 100 sq. microns, less than 25 microns, less than 1 sq. microns, and less than 0.06 microns, as the first material is surround by the pattern via the second molecular species, see col. 3, lines 56-59 and col. 4, lines 40-45. The terminations of the second molecular species and the first being on and exposed away from the surface are defined

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by the pattern as shown in FIG. 3. See also patented claims and col. 8, lines 1-5. Claims 3-10 are met.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 11-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over USPN 4,728,591 to Clark et al. and USPN 5,077,085 to Schnur et al.

Clark essentially teaches the claimed invention above, as applied to claim 1.

Regarding claims 11, and 14-15, Clark does not teach a nonplanar surface on the silicon substrate (col. 3, line 63).

Schnur teaches a patterned molecular assembly having a substrate that has a metal pattern or pattern via radiation on the surface of a substrate for self-assembled monolayers to alter reactivity or create spatially first and second areas of different reactivity in semiconductor microlithography (col. 6, lines 45-col. 7, line 6, Abstract, col. 7, lines 1-5, col. 7, line 65-col. 8, line 35, col. 8, line 46, and col. 9, lines 10-20 and 58-63).

It would have been obvious to one having ordinary skill in the art to have modified the silicone substrate of Clark to further provide a nonplanar surface because Schnur teaches a patterned molecular assembly having a silicon substrate that has a metal pattern or pattern via

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radiation on the surface of a substrate for self-assembled monolayers to alter reactivity or create spatially first and second areas of different reactivity in semiconductor microlithography (col. 6, lines 45-col. 7, line 6 of Schnur, Abstract, col. 7, lines 1-5, col. 7, line 65-col. 8, line 35, col. 8, line 46, and col. 9, lines 10-20 and 58-63). Thus, the claimed invention would produce the same invention and perform in the same way as Applicant as the same materials are provided by the prior art.

Regarding claims 12-13, Clark does not teach the surface of the silicon substrate having or in a hydrophilic and hydrophobic functionality (col. 3, line 63).

Schnur teaches a patterned molecular assembly having a substrate comprising silicon and palladium where the surface of a n-type silicon wafer has an hydrophilic and hydrophobic functionality because the surfaces are both hydrophilic and hydrophobic, where when contacted with water on the hydrophilic surface it spread to form a film thereon and when the surface was silanized the surface was hydrophobic by a technique to pattern the substrate and enable a monomolecular film to be chemisorbed onto the silicon substrate (Abstract, col. 11, lines 1-60, col. 7, lines 1-5, col. 7, line 65-col. 8, line 35, col. 8, line 46, and col. 9, lines 10-63).

It would have been obvious to one having ordinary skill in the art to have modified the silicone substrate of Clark to provide a hydrophilic and hydrophobic functionality as claimed because Schnur teaches the surfaces are both hydrophilic and hydrophobic, where when contacted with water on the hydrophilic surface it spread to form a film thereon and when the surface was silanized the surface was hydrophobic by a technique to pattern the substrate and enable a monomolecular film to be chemisorbed onto the silicon substrate (Abstract, col. 11, lines 1-60, col. 7, lines 1-5, col. 7, line 65-col. 8, line 35, col. 8, line 46, and col. 9, lines 10-63).

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Thus, the claimed invention would produce the same invention and perform in the same way as Applicant as the same materials are provided by the prior art.

Claims 55-59 and 69-75 are rejected under 35 U.S.C. 103(a) as being unpatentable over USPN 4,728,591 to Clark et al. and USPN 5,077,085 to Schnur et al.

Regarding claims 55-59 and 69-75, Clark teaches a device comprising: an article defining a surface (col. 2, line 32, e.g. substrate surface); and an isolated region of a self-assembled monolayer of a first molecular species having a function (col. 2, lines 49-55, e.g. a functional material deposited through holes such as a protein molecules) surrounded by a second molecular species on the surface (col. 2, lines 40-49, e.g. two-dimensional self-assembled molecular array of protein molecules). The isolated region in lateral dimension and area (encompassed by characteristic dimension) is between 1-50 nm (.01-.5 microns), meeting Applicant's range of less than about 10 microns, 5 microns, 1 micron, and 0.25 microns, less than 100 sq. microns, less than 25 microns, less than 1 sq. microns, and less than 0.06 microns, as the first material is surround by the pattern via the second molecular species, see col. 3, lines 56-59 and col. 4, lines 40-45. The terminations of the second molecular species and the first being on and exposed away from the surface are defined by the pattern as shown in FIG. 3. See also patented claims and col. 2, lines 60-68, col. 8, lines 1-5 and col. 15, lines 10-30, lines 45-50, and col. 16, lines 20-50.

Further regarding claims 55 and 69, Clark does not teach a substrate comprising palladium.

Clark teaches a substrate of silicon (col. 3, line 63).

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Schnur teaches a patterned molecular assembly having a substrate comprising silicon and palladium (Abstract, col. 7, lines 1-5, col. 7, line 65-col. 8, line 35, col. 8, line 46, and col. 9, lines 10-20 and 58-63).

It would have been obvious to one having ordinary skill in the art to have included palladium to the substrate of Clark because Schnur teaches a substrate of silicon and of metals like palladium and the addition of palladium to a substrate, thereby teaching equivalence used in supporting patterned molecular assemblies (col. 7, lines 1-5, col. 7, line 65-col. 8, line 35, col. 8, line 46, and col. 9, lines 10-20 and 58-63 of Schnur. Thus, the claimed invention would produce the same invention and perform in the same way as Applicant as the same materials are provided by the prior art.

Response to Arguments

Applicant's arguments filed 03-23-06 have been fully considered but they are not persuasive.

Applicant argues the 102(b) rejection over Clark stating that the although Clark teaches a self-assembled molecular array, it is inconsistent with a self-assembled monolayer because Clark teaches varying density thickness, and/or chemical reactivity variations. While Clark may teach this, Clark also teaches the self-assembled molecular monolayer as claimed having all the structural and material requirements. See the FIGS. showing the isolated regions and the holes 16 are filled with the first material, terminating at ends shown in the FIGS. See especially FIG. 1, 2, and 5. Applicant pointed to Clark not comprising palladium, which the Examiner did

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address in the 103, thus to correct this informality, claim 69 is included in the rejection statement for the 103.

Applicant argues the 103 rejection in that while the palladium of claims 55 and 69 is taught by Schnur, it is in the context of a colloidal catalytic precursor that adheres to a surface, rather than as part of a surface onto which a self-assembled layer of molecular species pattern is on. However, Clark explicitly teaches a silicon substrate having a monolayer thereon and Schur explicitly teaches and shows palladium/Pd as a surface coating on a silicon dioxide substrate as the claims require (e.g. "article defining a surface comprising palladium"). See col. 6, line 34-50 of Schur (a silicon substrate is achieved by silanizing a silicon wafer...the wafer's surface then coated with a Pd/Sn...adherence of Pd/Sn to the substrate") and FIGS. 1A-5 showing the deposition of a silane monolayer.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

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however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tamra L. Dicus whose telephone number is 571-272-1519. The examiner can normally be reached on Monday-Friday, 7:00-4:30 p.m., alternate Fridays.


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Rena Dye can be reached on 571-272-3186. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Tamra L. Dicus
Examiner
Art Unit 1774

June 7, 2006



RENA DYE
SUPERVISORY PATENT EXAMINER

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